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Advanced Television Systems Committee

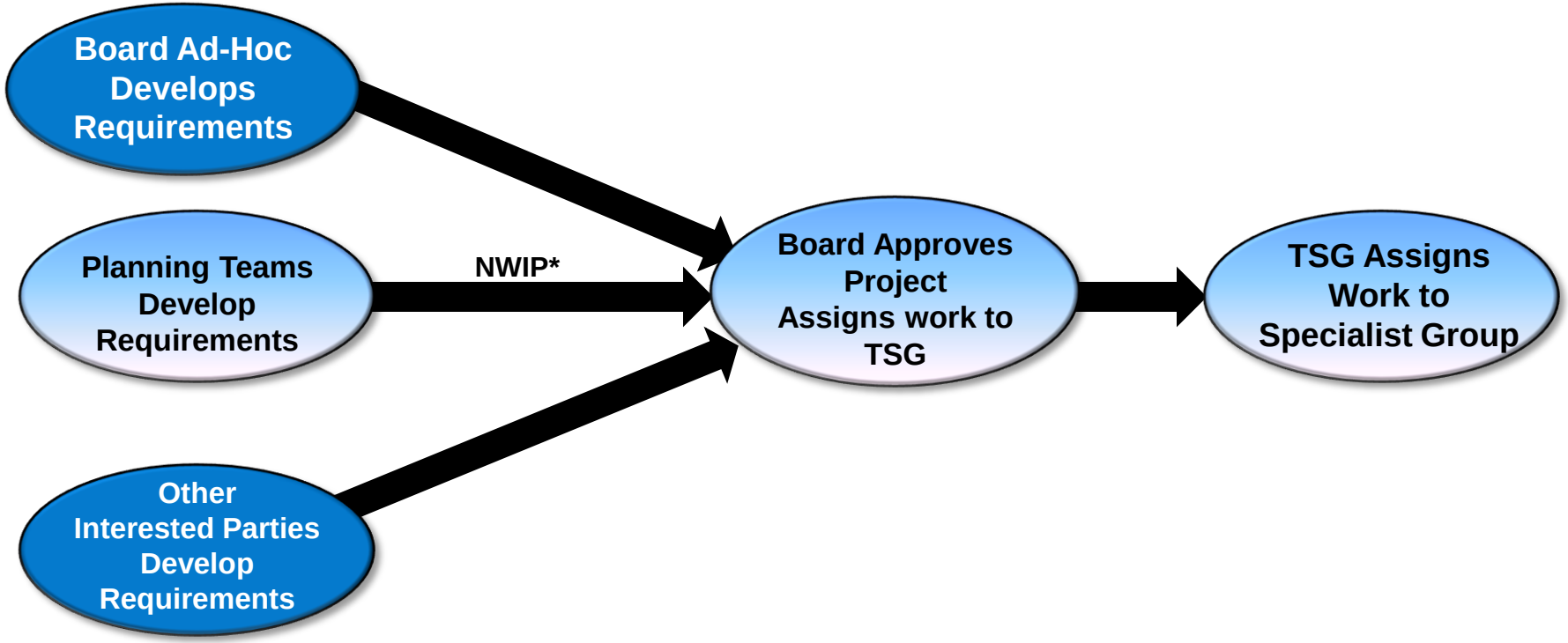
About the ATSC

- Standards Development Organization for Digital Television
  - Founded in 1983 by CEA, IEEE, NAB, NCTA, and SMPTE
  - Focused on terrestrial digital television broadcasting
  - ATSC is an open, due process organization.

About the ATSC

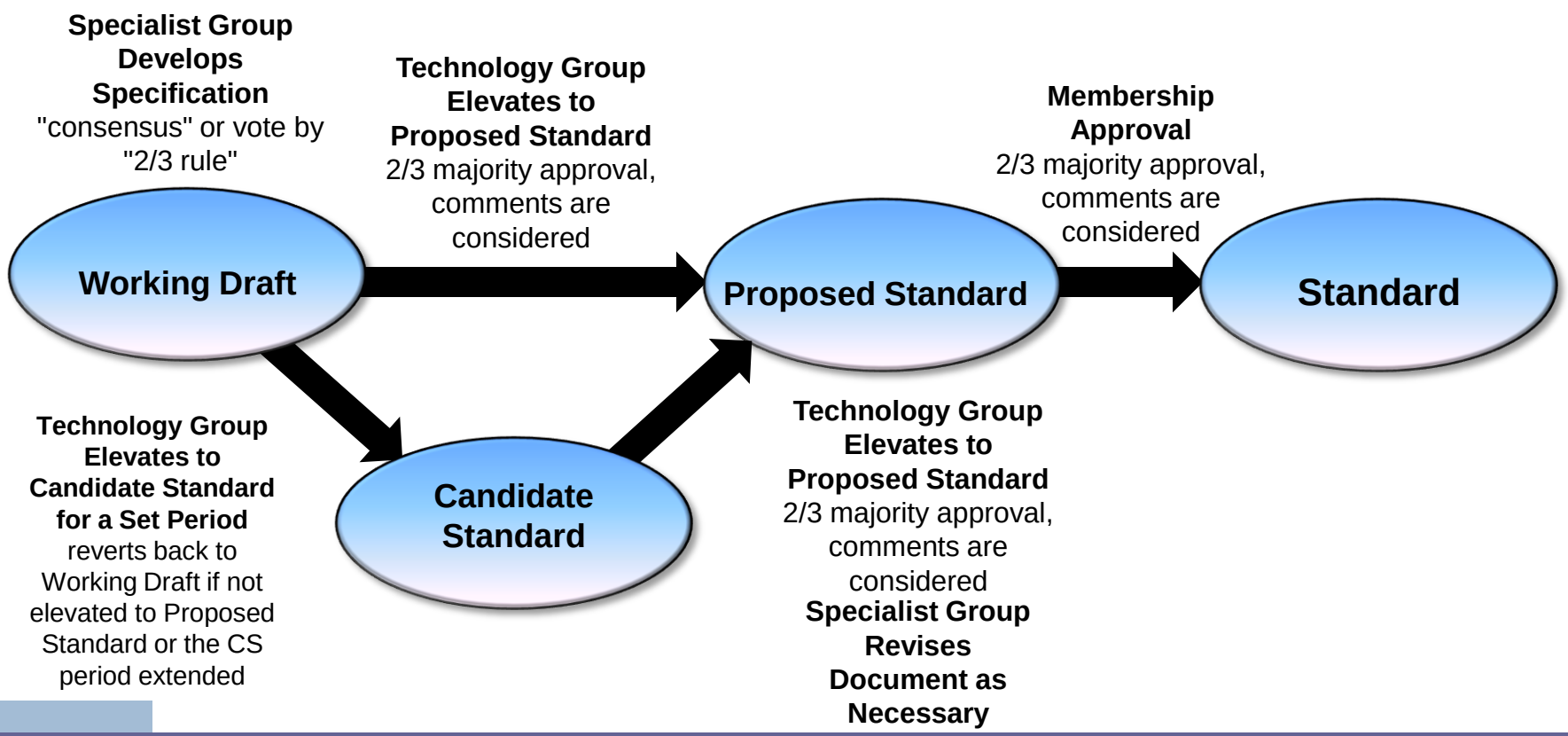
Approximately 160
International member organizations including companies and organizations from the broadcast & broadcast equipment, cable & satellite, motion picture, consumer electronics, computer, semiconductor industries and universities

Project Approval & Assignment



*New Work Item Proposal

Development And Approval



ATSC Members

Board of Directors

Technology and Standards Group

TSG Specialist Groups:
- S1 PMCP
- S2 ACAP
- S3 Digital ENG
- S4 ATSC Mobile
- S6 Audio/Video Coding
- S8 Transport
- S9 Transmission
- S10 Receivers
- S11 ATSC 2.0
- S13 Data Broadcast

Planning Teams
- PT-1 3DTV
- PT-2 Next Generation Broadcast Television
- PT-3 Internet Enhanced Television

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ATSC Patent Policy

- The goal of the policy is to encourage companies to license essential claims on a reasonable, non-discriminatory basis.
- The policy requires participants to disclose essential claims known to be in a Specification document.
- A license to the Essential Claim will be made available upon request for the purpose of implementing the Specification Document
  - Without compensation to all applicants

    or
  - Under reasonable and nondiscriminatory terms and conditions to all applications

The full policy and related Patent Statements are available at www.atsc.org

ATSC DTV Standard (A/53)

Coding

- Video: MPEG-2 (HDTV & SDTV)
- Audio: AC-3 (5.1 Channel)

A/72 defines use of AVC/MPEG4 Coding

Transport Layer

- MPEG-2

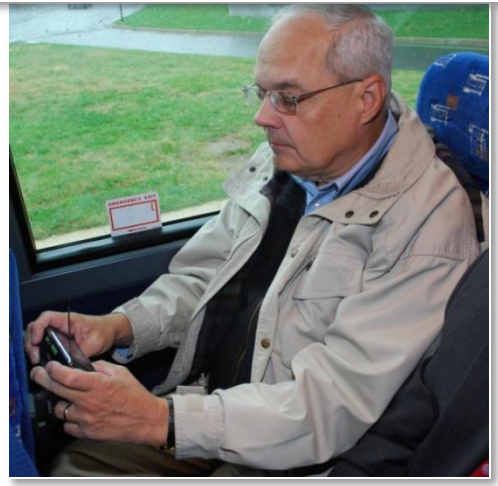
Transmission

- Vestigial Sideband (VSB)
- 19.4 M/bits per second in 6MHz Channels

ATSC DTV Standard (A/53)

- Highly Flexible
  - New functions and services added while maintaining Backwards compatibility!
    - Program and Systems Information Protocol (PSIP)
    - AVC/MPEG 4 video coding
    - Mobile
    - 3DTV (demonstration)
    - Non-realtime file delivery

ATSC Mobile DTV Standard approved on October 15, 2009



ATSC Mobile DTV Standard

Presentation Layer

MPEG-4 AVC (ITU-R H.264) video coding

HE AAC v2 audio coding
Closed captioning

Management Layer
Transport – Internet Protocol

Streaming and non-real-time file transfer
Electronic Service Guide - based on OMA BCAST

Physical Layer (Transmission)

- Vestigial Sideband (VSB)
- 19.4 M/bits per second in 6MHz Channels
- RF transmission and forward error correction
  Compatibility with legacy 8-VSB receivers/decoders

Flexible Program Service Combinations

	Example #1	Example #2	Example #3	Example #4
Mobile Services	1	4	2	2 & 10 Audio Services
Relative Quality	High Quality	Mid Quality	Mid Quality	Mid Quality
Video Bit Rate (kbps)	768	1600	800	800
Audio Bit Rate (kbps)	24	96	48	4
Mobile Total (Mbps)	3.688	7.336	3.668	5.502
Main/legacy (Mbps)	15.722	12.054	15.722	13.888

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Broad Array of Consumer Receivers

Non-RealTime (NRT)

- Non-Real Time – content delivered in advance of use and stored for later consumption
  - Most broadcast programming does not need to be delivered in real-time!
    - File based delivery
  - Addresses the growing desire for “everything on demand”
  - Storage cost reduction/increased capacity and advanced compression technologies are driving forces that make NRT practical

Potential NRT Services

- Various service scenarios have been identified as the basis for NRT technical requirements
  - News, weather, traffic, and sports clips
  - Long-form entertainment programming download
  - Program previews coupled with electronic guide
  - Telescoping ads
  - Targeted advertising

ATSC 2.0

- **ATSC 2.0** will be a complete suite of new services for the conventional fixed DTV receiver
  - Advanced video codecs A/72
  - Non-realtime/file based delivery
  - Conditional Access – A/70
  - Digital rights management
  - Advanced EPG
  - Audience measurement tools
  - ATSC Mobile DTV reception on fixed receiver

3DTV

Considering a standard for terrestrial broadcast delivery of 3DTV

Interim Report

and a Request for Information (RFI) just released

3DTV Broadcast Demo

November 2010
Seoul, Korea

Terrestrial Broadcast using
ATSC DTV Standard (A/53)

Next Generation Broadcast Television

ATSC exploring potential technologies to be used to define a new/future terrestrial broadcast digital television standard

- Series of Symposiums on Next Generation Broadcast Technologies
  - Advanced Video Codecs: What's On The Horizon?
  - Transmission Technologies for Next-generation Digital Terrestrial Broadcasting
  - Latest Trends In Worldwide Digital Terrestrial Broadcasting and Application
  - Toward The Construction Of Hybridcast
  - A Revolutionary Digital Broadcasting System: Making The Fullest Possible Use Of Bandwidth
  - Beyond Coding: Getting 3D Audio Into The Home
  - Self-Organizing Broadcast Network
  - MPEG-4 HE-AAC – The Audio Codec For The Next Generation Broadcast Television

Next Generation Broadcast Television

- Next Generation High Efficiency Video Coding Standard
  - Gary Sullivan / Microsoft
- Next-Generation 3-D Audio – Creation, Transmission and Reproduction
  - Jean-Marc Jot / DTS
- Basic study of Next-Generation Digital Terrestrial Broadcasting transmission system for handheld and mobile reception
  - Yoshikazu Narikiyo, Masahiro Okano, and Masayuki Takada / NHK STRL
- Exploring Innovative Opportunities in ATSC Broadcasting: Convergence in the UHF band in USA
  - Mike Simon / Rohde & Schwarz ; Mark Aitken / Sinclair Broadcast

Next Generation Broadcast Television

- Information Theory, Shannon Limit, and Advances in Error Correction
  - Yiyan Wu / CRC
- Near-Capacity BICM-ID-SSD, a Good Candidate for Future DTTB System
  - Jian Song / Tsinghua University, Beijing
- DVB-T2 in relation to the DVB-x2 Family of Standards
  - Nick Wells / BBC Research and Development
- On the Application of MIMO in DVB
  - Joerg Robert / Institut fuer Nachrichtentechnik, Technische Universitaet Braunschweig
- A Hybrid MIMO System for Terrestrial Broadcasting of Next Generation ATSC
  - B.G. Jo a / The School of Electronics Engineering, Kyungpook National University, Korea

Next Generation Broadcast TV

- ATSC Board to outline strategy for NGBT over the next few months
- Mark's List of Key attributes:
  - –Configurable
  - –Scalable
  - –Efficient
  - –Interoperable
  - –Adaptable

Summary

- ATSC is the organization focused on the advancement of terrestrial broadcast technology
- The ATSC DTV Standard has proven to be a highly flexible system
- ATSC to focus on development of the Next Generation Broadcast Television system

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